- Extend analog or digital signals wirelessly up to 40km line-of-sight
- 2 x analog inputs (4-20mA, 0-5V, 0-10V)
- 2 x analog outputs (4-20mA, 0-5V, 0-10V)
- 2 x isolated digital inputs (2.5 to 30V)
- 2 x relay outputs (240V; 5A)
- DIN rail mountable
- "Link OK" Digital Output
- 24V DC Powered

The KTA-296 Wireless I/O extender pair offers a convenient way for analog or digital signals to span large distances via a wireless link. The KTA-296 is designed to operate as a pair, where the I/O from one unit "mirrors" the I/O from the other. That is, the digital inputs on one unit trigger the relay outputs on the other unit, and the analog inputs on one unit sets the analog outputs on the other.

I/O Mapping

Device 1	Device 2
Digital Input 1	Relay 1
Digital Input 2	Relay 2
Analog Input 1	Analog Output 1
Analog Input 2	Analog Output 2

Note: Digital Inputs 3 and 4, and Analog Inputs 3 and 4, are unused on the KTA-296.

The Digital Inputs are bi-directional, and optically isolated. They will suit NPN, PNP, and dry contact style sensors up to 30V DC.

The digital outputs are mechanical relays rated up to 240V AC/30V DC and 5A. Optically Isolated outputs are a non-standard option

The Analog Inputs by default suit 4 to 20 mA style instruments. 0 to 20 mA, 0 to 5V and 0 to 10V are non-standard options.

The Analog Outputs by default are 4 to 20 mA. 0 to 20mA, 0 to 5V, and 0 to 10V are non-standard options.

Quick Start Guide

The KTA-296 pair has been pre-configured in the factory with default settings. It is recommended to leave the unit at default unless changes are necessary.

Default:
Poll time: 10s
Tx Power: 30dBm
Air Speed: 16

Ensure that antennas are plugged into the radio of each KTA-296. Apply power (24V DC). Allow 5 minutes for the radios to detect each other and establish a link. The status LED can be monitored for this purpose; if flashing, there are no communications, if solidly on, the link is established and the KTA-296 is ready for operation. An open collector style digital output is available at AI3 to indicate if the link is good.

Each radio also has a transmit and receive LED. These can be monitored to view traffic on the wireless link and establish if the radios have found each other. See below for comms details.

Device Overview

The KTA-296 operates as a pair. Packets are sent over the radio link to update each device as inputs change. **A change on the state of a digital input will trigger a packet to be sent. A change in an analog input of more than 4% will trigger a packet to be sent.** Even if there is no change on the inputs, a packet will be sent as frequently as the "poll time" to ensure that both devices remain in sync.

Should a device send a packet but not receive a response, it will try sending the packet up to another 3 times. If there is still no response, the device times out and shows "comms down" on the status LED.

To prevent radio traffic from becoming excessive, there is a minimum period that the radios must wait before transmitting on the link. This period is random between 1 and 5 seconds, and is changed after every packet is transmitted.

Connections:

Name	Description
V+	12 or 24V DC power (depending on model)
GND	Ground
DI 1+	Positive side of optically isolated digital input 1*
DI 1−	Negative side of optically isolated digital input 1*
DI 2+	Positive side of optically isolated digital input 2*
DI 2−	Negative side of optically isolated digital input 2*
AO 1	Analog Output 1
AO 2	Analog Output 2
AI 1	Analog Input 1
AI 2	Analog Input 2
RELAY 1 NO	Normally Open contact of relay 1
RELAY 2 COM	Common contact of relay 1
RELAY 2 NO	Normally Open contact of relay 1
RELAY 2 COM	Common contact of relay 1
USB	Only used for firmware updates on the KTA-296
Radio	RFD900 long range radio transceiver (900MHz)
AI3	"Link OK" open collector output

* The digital inputs are labelled as positive and negative, but in practice polarity is not important because they are bi-directional.

Leds:

Name	Description
RELAY 1	Indicates if relay 1 is on
RELAY 2	Indicates if relay 2 is on
RADIO	Shows the status of the radio after configuration: • **Off.** Radio is ready to communicate at the default comms settings. • **Solidly On**. The radio has been initialised correctly after configuration, and is ready to communicate • **Flashing slowly** (once a second). No radio has been found, or unable to communicate to the radio. Check

	to ensure the radio is properly plugged into the socket. • **Flashing quickly** (ten times a second). Unknown error; the radio has been found, but an error occurred when initialising.
COMMS	Shows the status of the communications between the two radios: • **Solidly On**. Both devices are communicating successfully • **Flashing slowly** (once a second). Communications timed out. The link is down or out of range. • **Flashing quickly** (ten times a second). Bad or unknown packet. A message was received, but it is not in a format that is recognised or can be decoded.
TRANS	Transmit. Flashes every time a message is transmitted over the radio link
RECEIVE	Flashes every time a message is received on the radio link

DIP switches:

(The enclosure will need to be removed to access)

Switch 1
Modbus Addressing

Switch 1	Modbus Addressing
OFF	Master = 1; Slave = 2
ON	Master = 2; Slave = 1

Switches 2 & 3
Poll time

Switch 2	Switch 3	Poll Time
OFF	**OFF**	5 s
ON	**OFF**	10 s
OFF	**ON**	15 s
ON	**ON**	20 s

Switch 4
Activate Config Mode

Config mode is used to send a new set up to the radio module, using the RFD900 config software (discussed in more detail below).

Switch 4	Radio Mode
OFF	Normal
ON	Config

Switch 5
Digital IOs behaviours if lose connection

Switch 5	Behaviours
OFF	The digital IOs will remain the same if lose connection
ON	The digital IOs will reset if lose connection

Other switches should stay OFF.

RFD900 Configuration Utility

The factory default radio parameters for the KTA-296 should be adequate for most applications. Having said that, it is possible to reconfigure these settings using the provided utility.

Steps:

1. Plug the KTA-296 into a PC via USB. Remove the lid and **turn on switch 4**. Apply power.

2. Download and launch the RFD900 config utility from the Ocean Controls website.

3. Select the COM port that the USB is connected on using the dropdown box under "connection".

4. Set the following parameters (items in bold are mandatory, do not change):

   - **Baud rate: 57600**

   - **Air speed: 16**

   - Net ID (default: 1): same as "channel." If multiple radios are in range of each other, they will need to talk on separate channels simiarly to a walkie talkie. Can be set to any number, but each pair will need to be on the same channel to communicate.

   - **Tx Power (default: 30 dBm)**. Transmit power. More transmit power generally means better range, but more interference with other devices also transmitting on 900MHz whithin range.

   - **Min Freq: 915000**

   - **Max Freq: 921000**

   - **Number of Channels: 20**

   - **Duty Cycle: 100**

   - **ECC: not ticked**

   - **Mavlink: Mavlink**

5. Press "Write Settings" to download to the radio. If successful, you will see "Done" display in the messages window at the bottom.

6. Turn off switch 4 to return the radio to normal operation.